

## **TANGANELLI SERGIO**

### ***Curriculum vitae***

Il prof. Sergio Tanganelli, nato a Siena il 15.12.1950, ha conseguito la laurea in Chimica e Tecnologia Farmaceutiche presso l'Universita' di Pisa il 7.4.1976.

Dal 1976 al 1985, e' stato assistente incaricato e successivamente tecnico laureato presso l'Istituto di Farmacologia, Facolta' di Medicina e Chirurgia, Univ. di Ferrara.

Dal 1985 al 1994, Professore Associato di Farmacologia Molecolare e Cellulare, Facolta' di Medicina e Chirurgia, Univ. di Ferrara.

Dal 1988 al 1989, vincitore di una borsa di studio C.N.R. (NATO advanced fellowship program), ha trascorso un periodo di ricerca presso il Dip. Di Neuroscienze, Karolinska Institutet di Stoccolma. Successivamente (1992, 1998, 2002 e 2004) ha trascorso alcuni mesi di studio in qualità di visiting professor presso il su citato Dipartimento (Karolinska Institutet).

Dal 1994 al 1997, e' stato Professore straordinario di Farmacologia, presso il Dip. "Bernard B. Brodie" della Facolta' di Medicina e Chirurgia, Univ. di Cagliari.

Dal 1998, e' Professore Ordinario di Farmacologia e Farmacoterapia presso la Facolta' di Farmacia, Universita' degli Studi di Ferrara.

Dal 2002 al 2005 e' stato delegato della Facolta' di Farmacia al Consiglio della Ricerca e al Consiglio di Amministrazione dell'Universita' di Ferrara.

Dal 2008 al 2011 e' stato delegato della Facolta' di Farmacia al Consiglio della Ricerca e al Senato Accademico dell'Universita' di Ferrara.

Dal 2012 al 2014 e' stato Presidente del Consiglio della Ricerca e al Senato Accademico dell'Universita' di Ferrara.

E' autore di 111 pubblicazioni su riviste internazionali nel settore della Neuroscienze, Neurofarmacologia e delle sostanze d'abuso. La ricerca scientifica svolta in questi anni si e' sviluppata nel settore delle Neuroscienze, ed in particolare, sullo studio delle interazioni sinaptiche tra neurotrasmettitori classici e neuropeptidi. La misura delle variazioni dell'efflusso di acetilcolina, dopamina, GABA e glutammato, indotta da stimoli fisiologici e dal trattamento con farmaci neurotrofici e neuropeptidi, e' stata utilizzata come indice per la valutazione dell'attivita' neuronale. L'impiego di tecniche in vivo (sonde da microdialisi) ed in vitro (fettine di tessuto cerebrale, sinaptosomi e colture cellulari) ha permesso di studiare i meccanismi alla base delle interazioni sinaptiche che controllano i processi neurosecretori in quelle aree cerebrali, correlate con patologie neurodegenerative e neuropsichiatriche.

Recentemente, l'interesse di ricerca si è rivolto: a) allo studio dei meccanismi neurochimici, morfologici e molecolari alla base degli effetti dei cannabinoidi (ed alcool) sui processi cognitivi; b) le alterazioni neurologiche e comportamentali indotte nella prole dall'esposizione pre e perinatale ai derivati ai cannabinoidi.

#### ELENCO DELLE PUBBLICAZIONI

- 1) Bianchi C, Spidalieri G, Guandalini P, Tanganelli S, Beani L. 1979. Inhibition of acetylcholine outflow from guinea-pig cerebral cortex following locus coeruleus stimulation. Neurosci Lett. 14(1):97-100.
- 2) Bianchi C, Tanganelli S, Beani L. 1979. Dopamine modulation of acetylcholine release from the guinea-pig brain. Eur J Pharmacol. 58(3):235-46.
- 3) Moroni F, Tanganelli S, Bianchi C, Moneti G, Beani L. 1980 A mass-fragmentographic approach to release studies of endogenous GABA, glutamic acid and glutamine "in vitro". Pharmacol Res Commun. 12(5):501-5.
- 4) Moroni F, Bianchi C, Tanganelli S, Moneti G, Beani L. 1981. The release of gamma-aminobutyric acid, glutamate, and acetylcholine from striatal slices: a mass fragmentographic study. J Neurochem. 36(5):1691-9.
- 5) Moroni F, Bianchi C, Moneti G, Tanganelli S, Spidalieri G, Guandalini P, Beani L. 1982. Release of GABA from the guinea-pig neocortex induced by electrical stimulation of the 'locus coeruleus' or by norepinephrine. Brain Res. 232(1):216-21.
- 6) Bianchi C, Tanganelli S, Marzola G, Beani L. 1982. GABA induced changes in acetylcholine release from slices of guinea-pig brain. Naunyn Schmiedebergs Arch Pharmacol. 318(4):253-8.
- 7) Beani L, Bianchi C, Siniscalchi A, Tanganelli S. 1983. Glycine-induced changes in acetylcholine release from guinea-pig brain slices. Br J Pharmacol. 79(2):623-8.
- 8) Tanganelli S, Bianchi C, Beani L. 1983. Diazepam antagonizes GABA- and muscimol-induced changes of acetylcholine release in slices of guinea-pig cerebral cortex. Naunyn Schmiedebergs Arch Pharmacol. 324(1):34-7.
- 9) Moroni F, Tanganelli S, Antonelli T, Carla V, Bianchi C, Beani L. 1983. Modulation of cortical acetylcholine and gamma-aminobutyric acid release in freely moving guinea pigs: effects of clonidine and other adrenergic drugs. J Pharmacol Exp Ther. 227(2):435-40.

- 10) Beani L, Bianchi C, Tanganelli S, Antonelli T. 1984. The modulation of acetylcholine release by noradrenaline, GABA and related compounds. Ann Ist Super Sanita. 20(1):17-9.
- 11) Beani L, Bianchi C, Siniscalchi A, Sivilotti L, Tanganelli S, Veratti E. 1984. Different approaches to study acetylcholine release: endogenous ACh versus tritium efflux. Naunyn Schmiedebergs Arch Pharmacol. 328(2):119-26.
- 12) Tanganelli S, Bianchi C, Beani L. 1985. The modulation of cortical acetylcholine release by GABA, GABA-like drugs and benzodiazepines in freely moving guinea-pigs. Neuropharmacology. 24(4):291-9.
- 13) Beani L, Tanganelli S, Antonelli T, Bianchi C. 1986. Noradrenergic modulation of cortical acetylcholine release is both direct and gamma-aminobutyric acid-mediated. J Pharmacol Exp Ther. 236(1):230-6.
- 14) Antonelli T, Beani L, Bianchi C, Rando S, Simonato M, Tanganelli S. 1986. Cortical acetylcholine release is increased and gamma-aminobutyric acid outflow is reduced during morphine withdrawal. Br J Pharmacol. 89(4):853-60.
- 15) Beani L, Bianchi C, Marchetti P, Tanganelli S. 1987. A simple integrator to process the electroencephalogram of small laboratory animals. J Pharmacol Methods. 17(3):219-29.
- 16) Beani L, Bianchi C, Tanganelli S, Antonelli T, Simonato M, Rando S. 1988. Inversion of the alpha-2 and alpha-1 noradrenergic control of the cortical release of acetylcholine and gamma-aminobutyric acid in morphine-tolerant guinea pigs. J Pharmacol Exp Ther. 247(1):294-301.
- 17) Beani L, Bianchi C, Ferraro L, Nilsson L, Nordberg A, Romanelli L, Spalluto P, Sundwall A, Tanganelli S. 1989. Effect of nicotine on the release of acetylcholine and amino acids in the brain. Prog Brain Res. 149-55.
- 18) Beani L, Tanganelli S, Antonelli T, Simonato M, Spalluto P, Tomasini C, Bianchi C. 1989. Changes in cortical acetylcholine and gamma-aminobutyric acid outflow during morphine withdrawal involve alpha-1 and alpha-2 receptors. J Pharmacol Exp Ther. 250(2):682-7
- 19) Tanganelli S, Antonelli T, Simonato M, Spalluto G, Tomasini C, Bianchi C, Beani L. 1989. Alpha 1-adrenoreceptor-mediated increase in acetylcholine release in brain slices during morphine tolerance. J Neurochem. 53(4):1072-6.

- 20) Spalluto P, Morari M, Ferraro L, Nordberg A, Antonelli T, Tanganelli S, Bianchi C, Beani L. 1989. Effect of (-)nicotine on GABA efflux from guinea pig cerebral cortex slices. Pharmacol Res. 21 Suppl 1:133-4.
- 21) Tanganelli S, von Euler G, Fuxe K, Agnati LF, Ungerstedt U. 1989. Neurotensin counteracts apomorphine-induced inhibition of dopamine release as studied by microdialysis in rat neostriatum. Brain Res. 502(2):319-24.
- 22) Fuxe K, Agnati LF, Jansson A, von Euler G, Tanganelli S, Andersson K, Eneroth P. 1990. Regulation of endocrine function by the nicotinic cholinergic receptor. Ciba Found Symp. 152:113-27.
- 23) Tanganelli S, Fuxe K, von Euler G, Eneroth P, Agnati LF, Ungerstedt U. 1990. Changes in pituitary-adrenal activity affect the apomorphine- and cholecystokinin-8-induced changes in striatal dopamine release using microdialysis. J Neural Transm Gen Sect. 81(3):183-94.
- 24) von Euler G, Fuxe K, Tanganelli S, Finnman UB, Eneroth P 1990. Changes in pituitary-adrenal activity affect the binding properties of striatal dopamine D-2 receptors but not their modulation by neurotensin and cholecystokinin-8. Neurochem Int. 16(3):275-80.
- 25) Tanganelli S, Fuxe K, von Euler G, Agnati LF, Ferraro L, Ungerstedt U. 1990. Involvement of cholecystokinin receptors in the control of striatal dopamine autoreceptors. Naunyn Schmiedebergs Arch Pharmacol. 342(3):300-4.
- 26) Tanganelli S, Antonelli T, Morari M, Bianchi C, Beani L. 1991. Glutamate antagonists prevent morphine withdrawal in mice and guinea pigs. Neurosci Lett. 122(2):270-2.
- 27) Beani L, Bianchi C, Ferraro L, Morari M, Simonato M, Spalluto G, Tanganelli S. 1991. Alpha-2 adrenoreceptor-mediated decrease in gamma-aminobutyric acid outflow in cortical slices and synaptosomes during morphine tolerance. J Pharmacol Exp Ther. 258(2):472-6.
- 28) Beani L, Tanganelli S, Antonelli T, Ferraro L, Morari M, Spalluto P, Nordberg A, Bianchi C. 1991. Effect of acute and subchronic nicotine treatment on cortical efflux of [3H]-D-aspartate and endogenous GABA in freely moving guinea-pigs. Br J Pharmacol. 104(1):15-20.
- 29) Fuxe K, Janson AM, Rosén L, Finnman UB, Tanganelli S, Morari M, Goldstein M, Agnati LF. 1992. Evidence for a protective action of the vigilance promoting drug modafinil on the MPTP-induced degeneration of the nigrostriatal

dopamine neurons in the black mouse: an immunocytochemical and biochemical analysis. Exp Brain Res. 88(1):117-30.

30) Fuxe K, Von Euler G, Agnati LF, Merlo Pich E, O'Connor WT, Tanganelli S, Li XM, Tinner B, Cintra A, Carani C, et al. 1992 . Intramembrane interactions between neurotensin receptors and dopamine D2 receptors as a major mechanism for the neuroleptic-like action of neurotensin. Ann N Y Acad Sci. 668:186-204.

31) O'Connor WT, Tanganelli S, Ungerstedt U, Fuxe K. 1992. The effects of neurotensin on GABA and acetylcholine release in the dorsal striatum of the rat: an in vivo microdialysis study. Brain Res. 573(2):209-16.

32) Fuxe K, Agnati LF, von Euler G, Tanganelli S, O'Connor WT, Ferré S, Hedlund P, Zoli M. 1992. Neuropeptides, excitatory amino acid and adenosine A2 receptors regulate D2 receptors via intramembrane receptor-receptor interactions. Relevance for Parkinson's disease and schizophrenia. Neurochem Int. 20 Suppl:215S-224S.

33) Tanganelli S, Fuxe K, Ferraro L, Janson AM, Bianchi C. 1992. Inhibitory effects of the psychoactive drug modafinil on gamma-aminobutyric acid outflow from the cerebral cortex of the awake freely moving guinea-pig. Possible involvement of 5-hydroxytryptamine mechanisms. Naunyn Schmiedebergs Arch Pharmacol. 345(4):461-5.

34) Fuxe K, O'Connor WT, Antonelli T, Osborne PG, Tanganelli S, Agnati LF, Ungerstedt U 1992. Evidence for a substrate of neuronal plasticity based on pre- and postsynaptic neurotensin-dopamine receptor interactions in the neostriatum. Proc Natl Acad Sci U S A. 89(12):5591-5.

35) Tanganelli S, Ferraro L, Bianchi C, Beani L. 1992. Changes in gamma-aminobutyric acid release induced by topical administration of drugs affecting its metabolism and receptors: studies in freely moving guinea pigs with epidural cups. Neurochem Int. 21(1):15-20.

36) Ueki A, Rosén L, Andbjør B, Agnati LF, Hallström A, Gojny M, Tanganelli S, Ungerstedt U, Fuxe K. 1993. Evidence for a preventive action of the vigilance-promoting drug modafinil against striatal ischemic injury induced by endothelin-1 in the rat. Exp Brain Res 96(1):89-99.

37) Tanganelli S, Li XM, Ferraro L, Von Euler G, O'Connor WT, Bianchi C, Beani L, Fuxe K. 1993. Neurotensin and cholecystokinin octapeptide control

synergistically dopamine release and dopamine D2 receptor affinity in rat neostriatum. Eur J Pharmacol. 230(2):159-66.

38) Ferraro L, Tanganelli S, Caló G, Antonelli T, Fabrizi A, Acciarri N, Bianchi C, Beani L, Simonato M. 1993. Noradrenergic modulation of gamma-aminobutyric acid outflow from the human cerebral cortex. Brain Res. 629(1):103-8.

39) Tanganelli S, Ferraro L, Bianchi C, Fuxe K. 1994. 6-hydroxy-dopamine treatment counteracts the reduction of cortical GABA release produced by the vigilance promoting drug modafinil in the awake freely moving guinea-pig. Neurosci Lett. 171(1-2):201-4.

40) Tanganelli S, O'Connor WT, Ferraro L, Bianchi C, Beani L, Ungerstedt U, Fuxe K. 1994. Facilitation of GABA release by neurotensin is associated with a reduction of dopamine release in rat nucleus accumbens. Neuroscience. 60(3):649-57.

41) Li XM, Ferraro L, Tanganelli S, O'Connor WT, Hasselrot U, Ungerstedt U, Fuxe K. 1995. Neurotensin peptides antagonistically regulate postsynaptic dopamine D2 receptors in rat nucleus accumbens: a receptor binding and microdialysis study. J Neural Transm Gen Sect. 102(2):125-37.

42) Tanganelli S, Pérez de la Mora M, Ferraro L, Méndez-Franco J, Beani L, Rambert FA, Fuxe K. 1995. Modafinil and cortical gamma-aminobutyric acid outflow. Modulation by 5-hydroxytryptamine neurotoxins. Eur J Pharmacol. 273(1-2):63-71.

43) Fuxe K, Li XM, Tanganelli S, Hedlund P, O'Connor WT, Ferraro L, Ungerstedt U, Agnati LF. 1995. Receptor-receptor interactions and their relevance for receptor diversity. Focus on neuropeptide/dopamine interactions. Ann N Y Acad Sci. 757:365-76.

44) Ferraro L, Tanganelli S, O'Connor WT, Bianchi C, Ungerstedt U, Fuxe K. 1995. Neurotensin increases endogenous glutamate release in the neostriatum of the awake rat. Synapse. 20(4):362-4.

45) Bianchi C, Ferraro L, Tanganelli S, Morari M, Spalluto G, Simonato M, Beani L. 1995. 5-Hydroxytryptamine-mediated effects of nicotine on endogenous GABA efflux from guinea-pig cortical slices. Br J Pharmacol. 116(6):2724-8.

46) Ferraro L, Tanganelli S, Marani L, Bianchi C, Beani L, Siniscalchi A. 1996. Evidence for an in vivo and in vitro modulation of endogenous cortical GABA release by alpha-glycerylphosphorylcholine. Neurochem Res. 21(5):547-52.

- 47) Ferraro L, Tanganelli S, O'Connor WT, Antonelli T, Rambert F, Fuxe K. 1996. The vigilance promoting drug modafinil increases dopamine release in the rat nucleus accumbens via the involvement of a local GABAergic mechanism. Eur J Pharmacol. 306(1-3):33-9.
- 48) Ferraro L, O'Connor WT, Li XM, Rimondini R, Beani L, Ungerstedt U, Fuxe K, Tanganelli S. 1996. Evidence for a differential cholecystokinin-B and -A receptor regulation of GABA release in the rat nucleus accumbens mediated via dopaminergic and cholinergic mechanisms. Neuroscience 73(4):941-50.
- 49) Ferraro L, Tanganelli S, O'Connor WT, Antonelli T, Rambert F, Fuxe K. 1996. The vigilance promoting drug modafinil decreases GABA release in the medial preoptic area and in the posterior hypothalamus of the awake rat: possible involvement of the serotonergic 5-HT<sub>3</sub> receptor. Neurosci Lett. 220(1):5-8.
- 50) Ferraro L, Antonelli T, O'Connor WT, Tanganelli S, Rambert F, Fuxe K. 1997. The antinarcotic drug modafinil increases glutamate release in thalamic areas and hippocampus. Neuroreport. 8(13):2883-7.
- 51) Ferraro L, O'Connor WT, Antonelli T, Fuxe K, Tanganelli S. 1997. Differential effects of intrastriatal neurotensin(1-13) and neurotensin(8-13) on striatal dopamine and pallidal GABA release. A dual-probe microdialysis study in the awake rat. Eur J Neurosci. 9(9):1838-46.
- 52) Ferraro L, Beani L, Bianchi C, Tanganelli S. 1997. Inhibitory cholinergic control of endogenous GABA release from electrically stimulated cortical slices and K(+)-depolarized synaptosomes. Neurochem Int. 31(6):795-800.
- 53) Ferraro L, Antonelli T, O'Connor WT, Tanganelli S, Rambert FA, Fuxe K. 1997. Modafinil: an antinarcotic drug with a different neurochemical profile to d-amphetamine and dopamine uptake blockers. Biol Psychiatry. 42(12):1181-3.
- 54) Vaccari A, Ferraro L, Saba P, Ruiu S, Mocci I, Antonelli T, Tanganelli S. 1998. Differential mechanisms in the effects of disulfiram and diethyldithiocarbamate intoxication on striatal release and vesicular transport of glutamate. J Pharmacol Exp Ther. 285(3):961-7.
- 55) Ferraro L, Antonelli T, O'Connor WT, Fuxe K, Soubrié P, Tanganelli S. 1998. The striatal neurotensin receptor modulates striatal and pallidal glutamate and GABA release: functional evidence for a pallidal glutamate-GABA interaction via the pallidal-subthalamic nucleus loop. J Neurosci. 18(17):6977-89.

- 56) Ferraro L, Antonelli T, O'Connor WT, Tanganelli S, Rambert FA, Fuxe K. 1998. The effects of modafinil on striatal, pallidal and nigral GABA and glutamate release in the conscious rat: evidence for a preferential inhibition of striato-pallidal GABA transmission. *Neurosci Lett.* 253(2):135-8.
- 57) Ferraro L, Antonelli T, Tanganelli S, O'Connor WT, Perez de la Mora M, Mendez-Franco J, Rambert FA, Fuxe K. 1999. The vigilance promoting drug modafinil increases extracellular glutamate levels in the medial preoptic area and the posterior hypothalamus of the conscious rat: prevention by local GABAA receptor blockade. *Neuropsychopharmacology.* 20(4):346-56.
- 58) Ferraro L, Tomasini MC, Siniscalchi A, Fuxe K, Tanganelli S, Antonelli T. 2000. Neurotensin increases endogenous glutamate release in rat cortical slices. *Life Sci.* 66(10):927-36.
- 59) Ferraro L, Fuxe K, Tanganelli S, Fernandez M, Rambert FA, Antonelli T. 2000. Amplification of cortical serotonin release: a further neurochemical action of the vigilance-promoting drug modafinil. *Neuropharmacology.* 39(11):1974-83.
- 60) Antonelli T, Ferioli V, Lo Gallo G, Tomasini MC, Fernandez M, O'Connor WT, Glennon JC, Tanganelli S, Ferraro L. 2000. Differential effects of acute and short-term lithium administration on dialysate glutamate and GABA levels in the frontal cortex of the conscious rat. *Synapse.* 38(3):355-62.
- 61) Ferraro L, O'Connor WT, Glennon J, Tomasini MC, Bebe BW, Tanganelli S, Antonelli T. 2000. Evidence for a nucleus accumbens CCK2 receptor regulation of rat ventral pallidal GABA levels: a dual probe microdialysis study. *Life Sci.* 68(5):483-96.
- 62) Ferraro L, Tomasini MC, Fernandez M, Bebe BW, O'Connor WT, Fuxe K, Glennon JC, Tanganelli S, Antonelli T. 2001. Nigral neurotensin receptor regulation of nigral glutamate and nigroventral thalamic GABA transmission: a dual-probe microdialysis study in intact conscious rat brain. *Neuroscience.* 102(1):113-2.
- 63) Ferraro L, Tanganelli S, Fuxe K, Bebe BW, Tomasini MC, Rambert FA, Antonelli T. 2001. Modafinil does not affect serotonin efflux from rat frontal cortex synaptosomes: comparison with known serotonergic drugs. *Brain Res.* 894(2):307-10.
- 64) Tanganelli S, Fuxe K, Antonelli T, O'Connor WT, Ferraro L. 2001. Cholecystokinin/dopamine/GABA interactions in the nucleus accumbens: biochemical and functional correlates. *Peptides.* 22(8):1229-34.



- 65) Ferraro L, Tomasini MC, Gessa GL, Bebe BW, Tanganelli S, Antonelli T. 2001. The cannabinoid receptor agonist WIN 55,212-2 regulates glutamate transmission in rat cerebral cortex: an in vivo and in vitro study. Cereb Cortex. 11(8):728-33.
- 66) Ferraro L, Tanganelli S, O'Connor WT, Francesconi W, Loche A, Gessa GL, Antonelli T. 2001. gamma-Hydroxybutyrate modulation of glutamate levels in the hippocampus: an in vivo and in vitro study. J Neurochem. 78(5):929-39.
- 67) Ferraro L, Tomasini MC, Cassano T, Bebe BW, Siniscalchi A, O'Connor WT, Magee P, Tanganelli S, Cuomo V, Antonelli T. 2001. Cannabinoid receptor agonist WIN 55,212-2 inhibits rat cortical dialysate gamma-aminobutyric acid levels. J Neurosci Res. 66(2):298-302.
- 68) Manfredini S, Pavan B, Vertuani S, Scaglianti M, Compagnone D, Biondi C, Scatturin A, Tanganelli S, Ferraro L, Prasad P, Dalpiaz A. 2002. Design, synthesis and activity of ascorbic acid prodrugs of nipecotic, kynurenic and diclophenamic acids, liable to increase neurotropic activity. J Med Chem. 45(3):559-62.
- 69) Ferraro L, Fuxe K, Tanganelli S, Tomasini MC, Rambert FA, Antonelli T. 2002. Differential enhancement of dialysate serotonin levels in distinct brain regions of the awake rat by modafinil: possible relevance for wakefulness and depression. J Neurosci Res. 68(1):107-12.
- 70) Tomasini MC, Ferraro L, Bebe BW, Tanganelli S, Cassano T, Cuomo V, Antonelli T. 2002. Delta(9)-tetrahydrocannabinol increases endogenous extracellular glutamate levels in primary cultures of rat cerebral cortex neurons: involvement of CB(1) receptors. J Neurosci Res. 68(4):449-53.
- 71) Díaz-Cabiale Z, Fuxe K, Narváez JA, Finetti S, Antonelli T, Tanganelli S, Ferraro L. 2002. Neurotensin-induced modulation of dopamine D2 receptors and their function in rat striatum: counteraction by a NTR1-like receptor antagonist. Neuroreport. 13(6):763-6.
- 72) Pistis M, Ferraro L, Pira L, Flore G, Tanganelli S, Gessa GL, Devoto P. 2002. Delta(9)-tetrahydrocannabinol decreases extracellular GABA and increases extracellular glutamate and dopamine levels in the rat prefrontal cortex: an in vivo microdialysis study. Brain Res. 948(1-2):155-8.
- 73) Antonelli T, Tomasini MC, Finetti S, Giardino L, Calzà L, Fuxe K, Soubriè P, Tanganelli S, Ferraro L. 2002. Neurotensin enhances glutamate excitotoxicity in mesencephalic neurons in primary culture. J Neurosci Res. 70(6):766-73.

- 74) Mereu G, Fà M, Ferraro L, Cagiano R, Antonelli T, Tattoli M, Ghiglieri V, Tanganelli S, Gessa GL, Cuomo V. 2003. Prenatal exposure to a cannabinoid agonist produces memory deficits linked to dysfunction in hippocampal long-term potentiation and glutamate release. Proc Natl Acad Sci U S A. 100(8):4915-20.
- 75) Castelli MP, Ferraro L, Mocci I, Carta F, Carai MA, Antonelli T, Tanganelli S, Cignarella G, Gessa GL. 2003. Selective gamma-hydroxybutyric acid receptor ligands increase extracellular glutamate in the hippocampus, but fail to activate G protein and to produce the sedative/hypnotic effect of gamma-hydroxybutyric acid. J Neurochem. 87(3):722-32.
- 76) Dalpiaz A, Pavan B, Scaglianti M, Vitali F, Bortolotti F, Biondi C, Scatturin A, Tanganelli S, Ferraro L, Prasad P, Manfredini S 2004. Transporter-mediated effects of diclofenamic acid and its ascorbyl pro-drug in the in vivo neurotropic activity of ascorbyl nipecotic acid conjugate. J Pharm Sci. 93(1):78-85.
- 77) Antonelli T, Tanganelli S, Tomasini MC, Finetti S, Trabace L, Steardo L, Sabino V, Carratu MR, Cuomo V, Ferraro L. 2004. Long-term effects on cortical glutamate release induced by prenatal exposure to the cannabinoid receptor agonist (R)-(+)-[2,3-dihydro-5-methyl-3-(4-morpholinyl-methyl)pyrrolo[1,2,3-de]-1,4-benzoxazin-6-yl]-1-naphthalenylmethanone: an in vivo microdialysis study in the awake rat. Neuroscience. 124(2):367-75.
- 78) Antonelli T, Ferraro L, Fuxe K, Finetti S, Fournier J, Tanganelli S, De Mattei M, Tomasini MC. 2004. Neurotensin enhances endogenous extracellular glutamate levels in primary cultures of rat cortical neurons: involvement of neurotensin receptor in NMDA induced excitotoxicity. Cereb Cortex. 14(4):466-73.
- 79) Tanganelli S, Sandager Nielsen K, Ferraro L, Antonelli T, Kehr J, Franco R, Ferré S, Agnati LF, Fuxe K, Scheel-Krüger J. 2004. Striatal plasticity at the network level. Focus on adenosine A2A and D2 interactions in models of Parkinson's Disease. Parkinsonism Relat Disord. 10(5):273-80.
- 80) Ferraro L, Fuxe K, Agnati L, Tanganelli S, Tomasini MC, Antonelli T. 2005. Modafinil enhances the increase of extracellular serotonin levels induced by the antidepressant drugs fluoxetine and imipramine: a dual probe microdialysis study in awake rat. Synapse. 55(4):230-41.
- 81) Dalpiaz A, Pavan B, Vertuani S, Vitali F, Scaglianti M, Bortolotti F, Biondi C, Scatturin A, Tanganelli S, Ferraro L, Marzola G, Prasad P, Manfredini S. 2005.

Ascorbic and 6-Br-ascorbic acid conjugates as a tool to increase the therapeutic effects of potentially central active drugs. Eur J Pharm Sci. 24(4):259-69.

82) Antonelli T, Tomasini MC, Tattoli M, Cassano T, Tanganelli S, Finetti S, Mazzoni E, Trabace L, Steardo L, Cuomo V, Ferraro L. 2005. Prenatal exposure to the CB1 receptor agonist WIN 55,212-2 causes learning disruption associated with impaired cortical NMDA receptor function and emotional reactivity changes in rat offspring. Cereb Cortex. 15(12):2013-20.

83) Antonelli T, Fuxe K, Tomasini MC, Bartoszyk GD, Seyfried CA, Tanganelli S, Ferraro L. 2005. Effects of sarizotan on the corticostriatal glutamate pathways. Synapse. 58(3):193-9.

84) Antonelli T, Fuxe K, Agnati L, Mazzoni E, Tanganelli S, Tomasini MC, Ferraro L. 2006. Experimental studies and theoretical aspects on A2A/D2 receptor interactions in a model of Parkinson's disease. Relevance for L-dopa induced dyskinesias. J Neurol Sci 248(1-2):16-22.

85) Antonelli T, Tomasini MC, Tattoli M, Cassano T, Finetti S, Mazzoni E, Trabace L, Carratù MR, Cuomo V, Tanganelli S, Ferraro L. 2006. Prenatal exposure to the cannabinoid receptor agonist WIN 55,212-2 and carbon monoxide reduces extracellular glutamate levels in primary rat cerebral cortex cell cultures. Neurochem Int. 49(6):568-76.

86) Antonelli T, Tomasini MC, Fuxe K, Agnati LF, Tanganelli S, Ferraro L. 2007. Receptor-receptor interactions as studied with microdialysis. Focus on NTR/D2 interactions in the basal ganglia. J Neural Transm. 114(1):105-13.

87) Fuxe K, Canals M, Torvinen M, Marcellino D, Terasmaa A, Genedani S, Leo G, Guidolin D, Diaz-Cabiale Z, Rivera A, Lundstrom L, Langel U, Narvaez J, Tanganelli S, Lluís C, Ferré S, Woods A, Franco R, Agnati LF. 2007. Intramembrane receptor-receptor interactions: a novel principle in molecular medicine. J Neural Transm. 114(1):49-75.

88) Ferraro L, Tomasini MC, Fuxe K, Agnati LF, Mazza R, Tanganelli S, Antonelli T. 2007. Mesolimbic dopamine and cortico-accumbens glutamate afferents as major targets for the regulation of the ventral striato-pallidal GABA pathways by neurotensin peptides. Brain Res Rev. 55(1):144-54.

89) Antonelli T, Fuxe K, Tomasini MC, Mazzoni E, Agnati LF, Tanganelli S, Ferraro L. 2007. Neurotensin receptor mechanisms and its modulation of glutamate

transmission in the brain: relevance for neurodegenerative diseases and their treatment. Prog Neurobiol. 83(2):92-109.

90) Antonelli T, Tomasini MC, Fournier J, Mazza R, Tanganelli S, Pironi S, Fuxe K, Luca F. 2008. Neurotensin receptor involvement in the rise of extracellular glutamate levels and apoptotic nerve cell death in primary cortical cultures after oxygen and glucose deprivation. Cereb Cortex. 18(8):1748-57.

91) Ferraro L, Tomasini MC, Mazza R, Fuxe K, Fournier J, Tanganelli S, Antonelli T. 2008. Neurotensin receptors as modulators of glutamatergic transmission. Brain Res Rev. 58(2):365-73.

92) Fuxe K, Marcellino D, Rivera A, Diaz-Cabiale Z, Filip M, Gago B, Roberts DC, Langel U, Genedani S, Ferraro L, de la Calle A, Narvaez J, Tanganelli S, Woods A, Agnati LF. 2008. Receptor-receptor interactions within receptor mosaics. Impact on neuropsychopharmacology. Brain Res Rev. 58(2):415-52

93) Marcellino D, Carriba P, Filip M, Borgkvist A, Frankowska M, Bellido I, Tanganelli S, Müller CE, Fisone G, Lluís C, Agnati LF, Franco R, Fuxe K. 2008. Antagonistic cannabinoid CB1/dopamine D2 receptor interactions in striatal CB1/D2 heteromers. A combined neurochemical and behavioral analysis. Neuropharmacology. 54(5):815-23.

94) Dalpiaz A, Gavini E, Colombo G, Russo P, Bortolotti F, Ferraro L, Tanganelli S, Scatturin A, Menegatti E, Giunchedi P. 2008. Brain uptake of an anti-ischemic agent by nasal administration of microparticles. J Pharm Sci. 97(11):4889-903.

95) García-Arencibia M, Ferraro L, Tanganelli S, Fernández-Ruiz J. 2008. Enhanced striatal glutamate release after the administration of rimonabant to 6-hydroxydopamine-lesioned rats. Neurosci Lett. 438(1):10-3.

96) De Risi C, Ferraro L, Pollini GP, Tanganelli S, Valente F, Veronese AC 2008. Efficient synthesis and biological evaluation of two modafinil analogues. Bioorg Med Chem. 16(23):9904-10.

97) Ferraro L, Tomasini MC, Tanganelli S, Mazza R, Coluccia A, Carratù MR, Gaetani S, Cuomo V, Antonelli T. 2009. Developmental exposure to methylmercury elicits early cell death in the cerebral cortex and long-term memory deficits in the rat. Int J Dev Neurosci. 27(2):165-74.

98) Fuxe K, Marcellino D, Woods AS, Giuseppina L, Antonelli T, Ferraro L, Tanganelli S, Agnati LF. 2009. Integrated signaling in heterodimers and receptor

mosaics of different types of GPCRs of the forebrain: relevance for schizophrenia. J Neural Transm. 116(8):923-39.

99) Antonelli T, Tomasini MC, Mazza R, Fuxe K, Gaetani S, Cuomo V, Tanganelli S, Ferraro L. 2009. Cannabinoid CB1 and cholecystokinin CCK2 receptors modulate, in an opposing way, electrically evoked [3H]GABA efflux from rat cerebral cortex cell cultures: possible relevance for cortical GABA transmission and anxiety. J Pharmacol Exp Ther. 329(2):708-17.

100) Ferraro L, Tomasini MC, Beggiato S, Gaetani S, Cassano T, Cuomo V, Amoroso S, Tanganelli S, Antonelli T. Short- and long-term consequences of prenatal exposure to the cannabinoid agonist WIN55,212-2 on rat glutamate transmission and cognitive functions. J Neural Transm. 116(8):1017-27.

101) Ferraro L, Tomasini MC, Beggiato S, Guerrini R, Salvadori S, Fuxe K, Calzà L, Tanganelli S, Antonelli T. 2009. Emerging evidence for neurotensin receptor 1 antagonists as novel pharmaceuticals in neurodegenerative disorders. Mini Rev Med Chem. 9(12):1429-38.

102) Fuxe K, Marcellino D, Borroto-Escuela DO, Guescini M, Fernández-Dueñas V, Tanganelli S, Rivera A, Ciruela F, Agnati LF. 2010. Adenosine-dopamine interactions in the pathophysiology and treatment of CNS disorders. CNS Neurosci Ther. 16(3):e18-42.

103) Ferraro L, Beggiato S, Marcellino D, Frankowska M, Filip M, Agnati LF, Antonelli T, Tomasini MC, Tanganelli S, Fuxe K. 2010. Nanomolar concentrations of cocaine enhance D2-like agonist-induced inhibition of the K+-evoked [3H]-dopamine efflux from rat striatal synaptosomes: a novel action of cocaine. J Neural Transm. 117(5):593-7

104) Ferraro L, Beggiato S, Tomasini MC, Fuxe K, Tanganelli S, Antonelli T. 2011. Neurotensin regulates cortical glutamate transmission by modulating N-methyl-D-aspartate receptor functional activity: an in vivo microdialysis study. J Neurosci Res. 2011 Oct;89(10):1618-26.

105) Chiodi V, Uchigashima M, Beggiato S, Ferrante A, Armida M, Martire A, Potenza RL, Ferraro L, Tanganelli S, Watanabe M, Domenici MR, Popoli P 2012. Unbalance of CB1 receptors expressed in GABAergic and glutamatergic neurons in a transgenic mouse model of Huntington's disease. Neurobiol Dis. 2012 Mar;45(3):983-91.

- 106) Ferraro L, O'Connor WT, Beggiato S, Tomasini MC, Fuxe K, Tanganelli S, Antonelli T. 2012 Striatal NTS1 , dopamine D2 and NMDA receptor regulation of pallidal GABA and glutamate release--a dual-probe microdialysis study in the intranigral 6-hydroxydopamine unilaterally lesioned rat. *Eur J Neurosci.* 2012 Jan;35(2):207-20.
- 107) Tanganelli S. 2012 Relevance of integration at the membrane level of receptor-receptor interactions in neurodegenerative diseases and drug addiction. *Curr Med Chem.* 2012;19(3):303
- 108) Tanganelli S, Antonelli T, Tomasini MC, Beggiato S, Fuxe K, Ferraro L 2012 Relevance of dopamine D(2)/neurotensin NTS1 and NMDA/neurotensin NTS1 receptor interaction in psychiatric and neurodegenerative disorders. *Curr Med Chem.* 2012;19(3):304-16. Review
- 109) Fuxe K, Borroto-Escuela DO, Marcellino D, Romero-Fernandez W, Frankowska M, Guidolin D, Filip M, Ferraro L, Woods AS, Tarakanov A, Ciruela F, Agnati LF, Tanganelli S. 2012 GPCR heteromers and their allosteric receptor-receptor interactions. *Curr Med Chem.* 2012;19(3):356-63.
- 110) Ferraro L., Beggiato S., Tomasini M.C., Fuxe K., Antonelli T., Tanganelli S. (2012). A(2A)/D(2) receptor heteromerization in a model of Parkinson's disease. Focus on striatal aminoacidergic signaling. *Brain Res.* 1476:96-107.
- 111) Ferraro L., Frankowska M, Marcellino D., Zaniewska M., Beggiato S., Filip M., Tomasini M.C., Antonelli T., Tanganelli S., Fuxe K. (2012). A novel mechanism of cocaine to enhance dopamine d2-like receptor mediated neurochemical and behavioral effects. An in vivo and in vitro study. *Neuropsychopharmacology.* 37(8):1856-66.
- 112) Ferraro L., Antonelli T., Beggiato S., Tomasini M.C., Fuxe K., Tanganelli S. (2012). The Vigilance Promoting Drug Modafinil Modulates Serotonin Transmission in the Rat Prefrontal Cortex and Dorsal Raphe Nucleus. Possible Relevance for its Postulated Antidepressant Activity. *Mini Rev Med Chem.* 13(4): 478-92.
- 113) Tomasini M.C., Beggiato S., Ferraro L., Tanganelli S., Marani L., Lorenzini L., Antonelli T. (2012). Prenatal exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin produces alterations in cortical neuron development and a long-term dysfunction of glutamate transmission in rat cerebral cortex. *Neurochem Int.* 61(5):759-66.

- 114) Antonelli T, Tomasini Mc, Castellazzi M, Sola P, Tamborino C, Ferraro D, Ferraro L, Granieri E. (2013) Biological markers in cerebrospinal fluid for axonal impairment in multiple sclerosis: acetylcholinesterase activity cannot be considered a useful biomarker. *Neurol Sci.*, 34(5):769-71.
- 115) Beggiato S, Antonelli T, Tomasini Mc, Tanganelli S, Fuxe K, Schwarcz R, Ferraro L. (2013). Kynurenic acid, by targeting  $\alpha 7$  nicotinic acetylcholine receptors, modulates extracellular GABA levels in the rat striatum in vivo. *Eur J Neurosci.*, 37(9):1470-7.
- 116) Beggiato S, O'connor Wt, Tomasini Mc, Antonelli T, Loche A, Tanganelli S, Cacciaglia R, Ferraro L. (2013). GET73 increases rat extracellular hippocampal CA1 GABA levels through a possible involvement of local mGlu5 receptor. *Synapse.*, 67(10):678-91.
- 117) Ferraro L, Loche A, Beggiato S, Tomasini Mc, Antonelli T, Colombo G, Lobina C, Carai Ma, Porcu A, Castelli Mp, Clerici F, Borelli Ac, Cacciaglia R, Tanganelli S. (2013) The New Compound GET73, N-[(4-trifluoromethyl)benzyl]4-methoxybutyramide, Regulates Hippocampal Aminoacidergic Transmission Possibly Via an Allosteric Modulation of mGlu5 Receptor. Behavioural Evidence of its "Anti-Alcohol" and Anxiolytic Properties. *Curr Med Chem.*, 20(27):3339-57.
- 118) Ferraro L, Beggiato S, Borroto-Escuela Do, Ravani L, O'connor Wt, Tomasini Mc, Borelli Ac, Agnati Lf, Antonelli T, Tanganelli S, Fuxe K. (2014) Neurotensin NTS1-Dopamine D2 Receptor-Receptor Interactions in Putative Receptor Heteromers: Relevance for Parkinson's Disease and Schizophrenia. *Curr Protein Pept Sci.*, 15(7):681-90.
- 119) Beggiato S, Antonelli T, Tomasini Mc, Borelli Ac, Agnati L, Tanganelli S, Fuxe K, Ferraro L. (2014). Adenosine A2A-D2 Receptor-Receptor Interactions in Putative Heteromers in the Regulation of the Striato-Pallidal GABA Pathway: Possible Relevance for Parkinson's Disease and its Treatment. *Curr Protein Pept Sci.* 2014;15(7):673-80.